AMATEUR SATELLITE REPORT

AMSAT's Newsletter for the Amateur Space Program.

Amateur Satellite Report is endorsed by the American Radio Relay League as the special interest Newsletter serving the Amateur Radio Satellite Community

Number 77
May 21, 1984

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UO-11 Heard At 1.2 GHz; Hope Springs Fresh

Using a large radar dish in Greenland, a team of SRI International scientists and engineers have developed impressive evidence that UO-11 is "alive". No positive sighting of UO-11 had been made since orbit 3 when at about 2300 UTC, 1 March 84, VK5AGR reported hearing the beacon.

The SRI team at Sondre Stromfjord used a 33 meter (100 foot) dish to listen to the 1.2 GHz command receiver local oscillator. They heard the weak (+7 dBm at the source) signal twice on 11 May. The first time was at 1403 UTC and the second occasion was the subsequent orbit when they heard it at 1542 UTC.

The facility at Sondre Stromfjord is an experimental L-band radar facility run by SRI International. The station chief is Finn Steenstrup, OX3FS. The installation was used as a sensitive receiver in response to requests for assistance to Dr. Robert Leonard, KD6DG, Director of the Radio Physics Laboratory of SRI International, Menlo Park, California. AMSAT's Executive Vice President WA2LQQ and later UO-11 Program Manager Dr. Martin Sweeting, G3YJO, requested the assistance of Dr. Leonard last month when it appeared circumstances warranted a major committment. Dr. Leonard was quick to volunteer to do what he could. Previously KD6DG and a team at SRI International had successfully commanded UO-9 from a serious malfunction (See *ASR* #42). The station at Sondre Stromfjord, 67 degrees North by 51 degrees West, is located on the west coast of Greenland. According to KD6DG, the receiver used at 1.2 GHz has a noise temperature of approximately 50 degrees K.

The problem with UO-11 began with what probably was a cold 2 meter beacon oscillator. (See *ASR* #74.) The theory held that it was operating erratically or partially due to regulator current limiting. It was thought that the resultant rf noise had been blocking each of the three command receivers. Commanding from Surrey proved futile. There were isolated reports of sightings of the 2 meter beacon being heard around 145.825 MHz but these could not be positively confirmed. G3YJO and his team tried listening for the "hash" from Jodrell Bank in England but without apparent success. An additional effort was mounted at SRI where it was thought the feeble emanations of the command receiver local oscillator could be heard.

Based on estimates of the oscillator's power (+ dBm), the mixer isolation (30 dB), the path loss, the Sondre Stromfjord's system noise temperature and the sky noise at 1.2 GHz, it was felt the team had a good chance to hear the local oscillator (LO).

The signals heard at 1403 UTC, 11 May exhibited the anticipated Doppler shift, were within the range of anticipated amplitudes and the source tracked perfectly according to the NASA predictions for object 14781 (UO-11). The large dish could not slew rapidly enough to keep pace with the swift movement of UO-11 so the dish was slewed as rapidly as possible in the desired direction. UO-11 thus passed through the "gaze" of the large parabolic dish and was visible for just a few moments. Long enough, however, to satisfy these professionals that they had seen what they were looking for. They even noted some amplitude variations which were interpreted as tumbling motions of the satellite.

Word of the successful sighting in Greenland was relayed to Menlo Park by telex and thence from KD6DG to G3AAJ in London by telephone. It being a weekend, many of the Surrey team were away. It thus fell to Ron, G3AAJ, to spread the good news among his colleagues. G3IOR alerted the AMSAT nets to the favorable developments on Sunday, 13 May.

FLASH!!!

UoSAT OSCAR 11 responds to command! Two-meter beacon (145.825 MHz) is turned on. The spacecraft responded to a 70 cm command uplinked from Surrey at 11:01 UTC, Monday, 15 May thus ending 10 weeks of silence. Initial telemetry indicates a healthy bird. Surrey says the two meter beacon will remain on while options for future commanding are studied. Delight in this favorable turn of events was immediately evident from all corners of the world. AMSAT President W3IWI has sent congratulations to the Surrey team on behalf of all AMSAT members. The official ARRL Bulletin station, W1AW, carried the good news as its lead bulletin on Monday afternoon. More news on the recovery of UO-11 next issue.

Hans, ZS6AKV, President AMSAT SA, (left) presents a $500 donation to AMSAT President W3IWI (28 April, 1984).

The next step in recovering the UO-11 mission will likely be an effort to overcome the "hash" by commanding with the multi-megawatt blast available from the 43 meter (150 foot) dish at SRI, Menlo Park. According to KD6DG, an attempt at 70 cm is imminent with only a few more pieces of hardware to be installed. The team plans to use essentially the same apparatus employed when UO-9 was commanded from the same facility. (See cover of *Orbit* #12.)

The UO-11 systems are discussed in an excellent article in *Orbit* #17 by G3YJO. G8NEF gave a systems overview in *ASR* #74 and 75.

In related developments, G8NEF has clarified some aspects of the UO-11 story appearing in *ASR* #75. Roger points out the expectation the watchdog timer would eventually turn off the offending beacon "was only one of our initial theories" which subsequently proved to be based on an "incorrect diagnosis (based on zero information) rather than any malfunction." Roger goes on to point out that elaborate precautions to avert a repetition of the travail of UO-9 (where 2 beacons were simultaneously activated) were installed by Neville, G8NOB and himself. However, it was impossible under the circumstances to determine which commands were correctly received by UO-11 and which were rejected. This, Roger correctly points out, was due more to a dirth of feedback from UO-11 than any fault at the controls at Surrey. Roger also points out that while it was discussed that it MIGHT be possible that NASA had labeled the wrong object as UO-11 (meaning everyone might be tracking an imposter!), they never seriously entertained the possibility. He states flatly that *ASR* overstated the case in saying "Surrey sources openly doubt [UO-11 is being tracked]." As it turns out, the NASA predictions were highly accurate and were vital in SRI's locating the bird.

The sightings at SRI are significant in at least two ways but do not absolutely assure the newest bird's salvation, unfortunately. The fact that the 1.2 GHz command receiver is apparently in good condition indicates that it and the power conditioning equipment are functioning and that at least part (and hoepfully all) of the spacecraft is alive. Second, confirmation of the Keplerian elements by virtue of having heard UO-11 exactly where and when expected is most helpful. It eliminates any doubt whatsoever about the accuracy of the element sets employed. The remarkable events of the past week do not quarantee that UO-11 will be commandable. There is still a critical series of events that must transpire before UO-11 can be considered back in order. The first of these will take place very soon as UoSAT team specialists prepare the command software for SRI that will hopefully soon return UO-11 to its promising course which, off to an auspicious beginning last March 1, has been diverted these 11 weeks now.

UoSAT-OSCAR 11 may be on the way back to a productive life. Stay tuned!

Short Bursts

• WH6AMX reports having worked two new DX stations on AO-10. They are UC2AAB and FR7DA. Nice catches, both. Anymore good catches to report?

• *ASR* will soon resume its feature "Spotlight" on productive AMSAT volunteers. Know someone you believe is worthy of being spotlighted here? Let us know and we'll take it from there. Help us find out who the real "doers" are and we'll help you recognize superior performance!

• Carlos Huertas, LU4ENQ, AMSAT's Chief Area Coordinator for South America has announced an extensive reorganization of AMSAT Argentina. He has appointed Art, LU1AHC, General Coordinator. Operational Coordinator named is Ignacio, LU1ESY. Pedro, LU1BUV is a brilliant programmer and has been appointed Software Manager. A team under the direction of Hugo, LU4DXT, at the University of La Plata has been charged with Special Projects including developments in packet radio. Two regional coordinators have been appointed as well. They are Daniel, LU6EEG, (Southern Region) and Luis, LU9JH (Northern Region). Congratulations to the appointees!

West Coast VHF/UHF Conference

The twenty-ninth annual West Coast VHF/UHF Conference was held 4-6 May 1984 at the beautiful Paso Robles Inn in California's Salinas Valley. A spirited group of 220 progressive amateurs gathered under the oak trees to socialize and to attend presentations on the latest developments in utilization of the higher frequencies. Planned and co-chaired by Cliff Buttschardt, W6HDO and Mike Goshay, K6HXW, the excellent program included numerous sessions of great interest to amateur satellite enthusiasts.

Bob Janeway, W6HVT, led off with "Amplifier Intercept Points Using Spectrum Analysis." Next came Folke Rasuall, SM5AGM, who talked about "VHF Operation and Grid

Locator System History." The attendees learned about the long struggle which preceded standardization on the system which is now being introduced to many parts of the world by the Stoner Challenge competition.

Jerry Haigwood, KY4Z, and Bob Stein, W6NBI, described "DL6WU Yagi Antenna Design Using the Home Computer." They followed up words with action by making their portable micro-computer capability available to the attendees for performance evaluations of individual designs.

Mike Staal, K6MYC, gave a DXpedition slide entitled "Moon Bouncing Outside the Continental 48," in which he shared his recent adventures in providing rare-country EME and 6-meter contacts. Referring to the preceeding presentation, Mike mentioned that KLM is proposing use of a standardized computer analysis technique to evaluate the gain of commercial antenna designs in order to have gain figures accepted for publication in *QST*. A wit in the audience observed that KLM uses db/mgh as a reference. This parameter translates to "Decibels with respect to More Gain Hill." Ken Holladay, K6HCP, who like Mike is associated with the same antenna manufacturer, quickly responded, "In this area, KLM is on shaky ground." Those who do not follow California news closely should be told that Morgan Hill, the site of KLM, recently gained notoriety by being at the epicenter of a moderately severe earthquake.

Paul Shuch, N6TX, briefed on "23 cm FM — the Newest Commercially Available Equipment." He described the impact of commercial designs on the development of a practical band plan and the difficulties encountered by the ARRL VHF-UHF Advisory Committee in dealing with the problem.

Jim Eagleson, WB6JNN, of Project OSCAR, covered recent progress in "Translators and Narrow Band Amplitude Compandored Sideband (ACSB) Techniques." As is the case with Packet communications, these development areas provide opportunities for AMSAT leadership in the establishment of amateur functional standards for both satellite and terrestrial applications. Jim was followed by John Browning, W6SP who talked about "The Future of AMSAT" and by John Pronko, W6XN, who gave an update on "AMSAT-OSCAR 10 Status."

Traditionalists will be heartened to learn that in spite of all the emphasis on computer analysis, the fun-filled weekend was concluded at the country fairgrounds with an old-fashioned, analog, antenna gain measuring session. — *W6SP*

Prior to booth opening at the 1984 Dayton Hamvention, preparations proceed with WDØEEK, N2CF and K9PVW at work.

Space Perspectives

An Editorial Comment by WA2LQQ

Owen Garriott's 2 meter operation from Space Shuttle Columbia (STS-9) last Autumn garnered the attention of radio amateurs worldwide. W5LFL opened a stimulating new chapter in Amateur Radio while becoming the first genuine "Ham-In-Space".

However, the STS-9 mission has not been without its critics. The intervening months have seen several negative assessments of the whole W5LFL effort. The critics have bemoaned STS-9 and soundly disparaged prospects of imminent reprise.

We are surprised and puzzled by the myopia manifested in our colleagues. With planning well-advanced for the next "Ham-In-Space" mission, we think it important to peel back the facade and get on to basics. What really lay beneath the hoopla and ballyhoo carnival atmosphere? Was anything meaningful accomplished on STS-9?

The critics focus primarily on two major themes: 1. Havoc reigned supreme as thousands jammed limited 2 meter frequencies, and 2. The announced schedule was inadequate or not observed.

Both themes warrant scrutiny.

The first criticism is accurate; factual. Unprecedented QRM erupted on 145 MHz in some areas. Discourtesy and downright reprehensible behavior was occasionally observed (and adequately reported). But the existence of QRM is not at all the point. There are more important issues involved than QRM!

Similarly the second criticism is accurate; factual. Operational constraints, simply the need to put space science ahead of Amateur Radio, meant limits on available air time. In some cases schedules had to be changed. Just as Amateur Radio is an adjunct to our daily lives, W5LFL's operation on STS-9 was an adjunct to the main business of flying a complex mission in space. Criticism here seems based more on factors of disappointment and chagrin in having missed out, we conclude. But again this criticism, although accurate, misses the larger point of the mission.

In fact the REAL point lies several layers above the muck of 2 meter QRM; above the disappointment of unfulfilled wishes to QSO Owen.

What was intended by NASA, W5LFL, ARRL, AMSAT, K6DUE and others who helped put the package together was to expose a broader segment of society (primarily the world's youth) to the wonder, fascination and challenge of Amateur Radio in the space context. Unequivocally, this was accomplished. With Pete O'Dell of ARRL, Doug Ward of NASA and Roy Neal of NBC feeding the press, truly un-

precedented coverage was afforded W5LFL. As a result, thousands have been prompted to study to become licensed radio amateurs. How many other tens of thousands may enter technical careers as a result of this episode is probably unknowable. An unqualified success in this category we'd suggest.

What was also intended was to crack the door a bit for a future, more ambitious synthesis of Space Shuttle and Amateur Radio. The aim was to show the rigorous safety and performance requirements of a manned spacecraft would not be anathema to amateur radio equipment be it a simple transceiver or more complex arrangements. This was clearly demonstrated with a modest beginning on STS-9. Everything worked well. We note with satisfaction the more ambitious, equipment-intensive plans for the Spring, 1985 flight of Dr. Tony England, WØORE. An unqualified success in this category as well, we'd suggest.

Seen in the context of primary objectives, who can deny STS-9 was enormously successful? In finding fault, the critics of W5LFL's efforts fail to peer through the QRM fog to the fundamental issues. Moreover, some self-described leaders in amateur space fail in a more serious sense.

Surely some of the QRM on 145 MHz was deliberate. There are a few nihilists out there who will "shoot" at anything resembling organized productive activity. But most of the QRM we observed resulted from simple ignorance of operating guidelines set forth to contact W5LFL. People were transmitting on the downlink frequencies for instance. Others were calling W5LFL while Owen himself was transmitting. Others had not the slightest notion of what they could do to increase their chances of success in contacting Owen. We ask whose responsibility it is to educate the ill-informed in the correct approach? We suggest it may be some of the self-same few who are now most vocal in their criticism. They should be leading the way to new and more effective ways to show folks the RIGHT way to do it next time.

We challenge the critics, the myopic moaners and groaners to channel their energies into making it work better next time. The inveterate complainers, we submit, would do well to light a few candles rather than curse the QRM.

So while the criticism may accurately cite fact (QRM and schedules), the critics are shortsighted. Certainly we can do better next time. But it will take better education of the users, more productive use of leadership energies and a firm view on objectives and the future if we are to un-mire ourselves from the terminal stillness we saw played out on 2 meters last Autumn. Given the uproar, it's a credit to the mission that so much was accomplished.

The mark of success is simply the degree to which an endeavor meets its established objectives. W5LFL's initial "Ham-In-Space" met every important objective and more. NASA was impressed. The public was inspired. Amateur Radio operators were challenged. Some succeeded; most had some fun trying. In the long view it was one of the most significant episodes in Amateur Radio history. We look to the myopic critics to get their collective wits together and prepare the public for the ambitious WØORE mission next Spring. They owe nothing less to those who seek leadership qualities in them.

As KO5I put it recently, "Either lead or follow but please don't block the road for those who would move forward."

John, G3BVU, (right) presents Rip, WA2LQQ, with a donation for the membership drive (29 April, 1984).

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Satellite: oscar-11
Catalog number: 14781
Epoch time:      84123.59972395
   Wed May  2 14:23:36.149 1984 UTC
Element set:     24
Inclination:      98.2440 deg
RA of node:      185.9254 deg
Eccentricity:    0.0014951
Arg of perigee:   69.4410 deg
Mean anomaly:    290.8396 deg
Mean motion:   14.61856627 rev/day
Decay rate:       3.56e-06 rev/day^2
Epoch rev:            904
Semi major axis:  7062.403 km
Anom period:     98.504872 min
Apogee:           713.180 km
Perigee:          692.062 km
Beacon:           145.8250 mhz
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